GENATLAS : GENE Database

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References omim HGNC sequences genelynx swissprot genecards Entrez Gene Ensembl source Unigene linkage

FLASH GENE

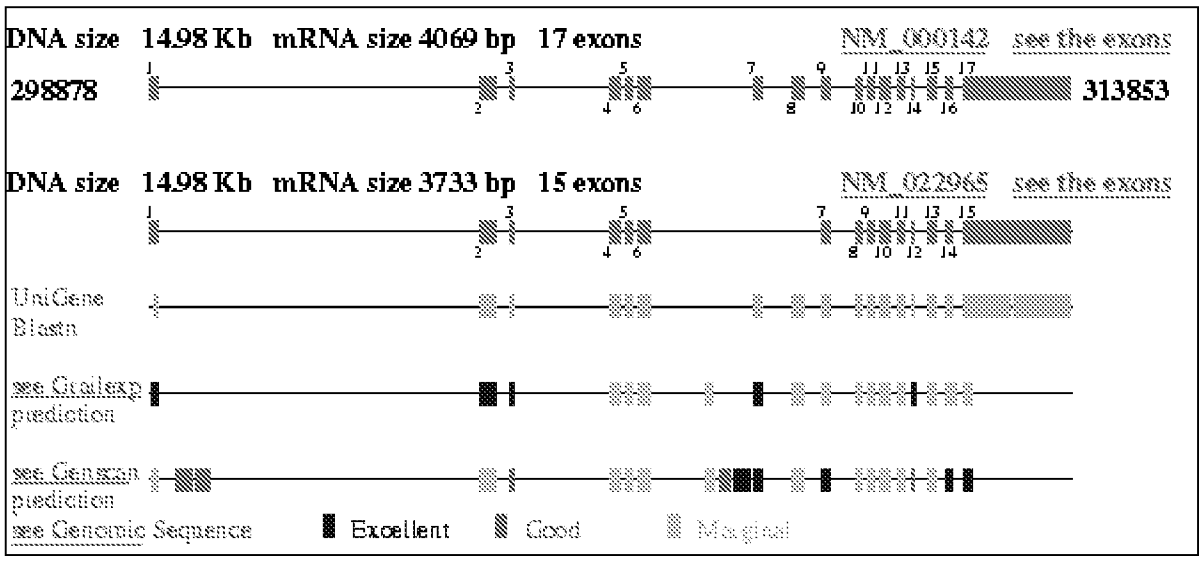
Symbol	FGFR3 *last update* : 03/07/2006
HGNC name	fibroblast growth factor receptor 3 (achondroplasia, thanatophoric dwarfism)
HGNC id	3690
Corresponding disease	ACH , CRS10 , CRS5B , CRSCNS , CRS8 , SADDAN , TNTP1 , TNTP2 , HCH , BSCGS2 , LADD2 , CATSHL
Location	4p16.3
Synonym name	tyrosine kinase JTK4
Synonym symbol(s)	ACH, CEK2, JTK4
EC.number	2.7.1.112, 2.7.10.1

DNA RNA EXP/sub-loc PROTEIN PATHOLOGY

DNA

TYPE	functioning gene
STRUCTURE	14,98 kb 15 Exon(s)

present in the contig : NT_037623 **of Genbank**



10 Kb 5' upstream gene genomic sequence study

regulatory sequence	cytosine-phosphate-guanine/HTF

Binding site transcription factor

text structure binding sites for sp1, AP2, Krox24, IgHC4 and ZESTE

MAPPING cloned Y linked N status confirmed

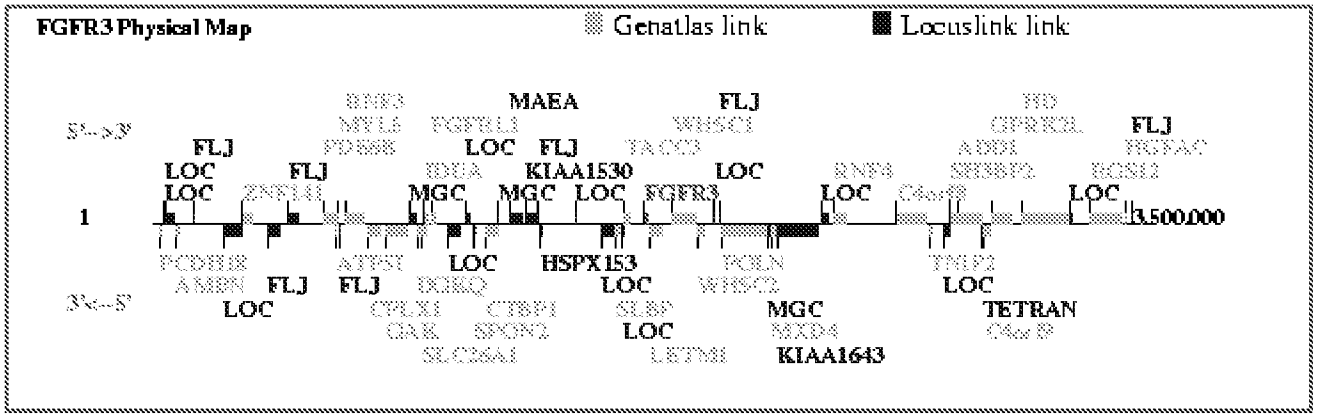
mode fluorescence in situ hybridization (FISH), neighbour analysis, recombinant DNA, somatic cell hybrid

Map pter - D4S115 - D4S168 - D4S113 - FGFR3 ,[D4S99 - D4S98] - D4S114 - D4S166 - WHSC2 - D4S43 - cen

Authors Gusella (92)

Text see D4S10

Physical map



RNA

Size 4093 bp

TRANSCRIPTS number of transcripts 5 type messenger

identification	nb exons	type	bp	product			
				kDa	AA	specific expression	author
FGFR3 IIIS	-	splicing	-	-	-	tumour and tumour cell lines	Sturla
	• soluble • regulate FGF and FGFR trafficking and function, possibly contributing to the development of a malignant phenotype						
FGFR3b	-	-	-	-	-	epithelial cells	Scotet, Veragavan
	• activated by FGF1, FGF3 • does not cooperate with the FGFR3c isoform in endochondral bone development						
FGFR3c	-	-	370	-	125	mesenchymal cells	Scotet, Jang, Veragavan
	• activated by FGF1, FGF4, FGF5, FGF6, FGF8 • main transducer of the balance between cell proliferation and differentiation during normal chondrocyte development						

FGFR3-V1 isoform IIIc	-	splicing	4093	87.7	806	in the inner retina	Keegan, Jang
	3 Ig-like domains, missing exon 8, using exon 9						
FGFR3-V2	-	-	3757	75	694	maybe secreted	Keegan, Wang
	2 Ig-like domains						
FGFR3-DAB	-	-	390	86	782	undifferenciated chondrocytes	Shimizu
	lacking the acid-box domain						

EXPRESSION / SUBCELLULAR LOCALIZATION

EXPRESSION (based on Unigene)

63 libraries where FGFR3 expressed	2.13 average number of ESTs/Library	0.17 average percent of ESTs/Library	See detail

EXPRESSION (based on citations)

expressed in

organ(s)

System	Organ 1	organ 2	organ 3	organ 4	level
blood / hematopoietic	spleen				lowly
Cardiovascular	heart				lowly
Nervous	brain				
Reproductive	male system	testis			
Skeleton	axial	skull			
Urinary	bladder				
	kidney				

tissue

System	Tissue	S_Tissue	Ss_Tissue	level
Connective	cartilage			
Lymphoid				

cells

System	Cell
	chondrocyte

cell lineage

cell lines

fluid/secretion

at STAGE

physiological period: fetal

Text: kidney, lung, small intestine, brain, lowly in spleen, liver, muscle, cartilage, skull

SUBCELLULAR LOCALIZATION

see plasma mb ontology

plasma membrane

PROTEIN

PHYSICAL PROPERTIES 87.7 kDa 806 aa

STRUCTURE

motifs/domains

PFAM graphic

- a signal peptide, three Ig-like domains

Prosite search run

- an acidic region between the first and second Ig loops
- a single membrane-spanning segment
- two C-terminal intracellular split tyrosine-kinase domains

Schema in N-ter to C-ter orientation

Domains
Binding sites
Zn fingers
Chains

Color legend	Ig-like C2-type	Protein kinase	ATP (By similarity	Fibroblast growth factor receptor

conjugated GlycoP

isoforms Precursor

HOMOLOGY

interspecies

homolog to chicken embryo kinase (CEK)

See homologies run

homolog to murine Fgfr3

intraspecies

See homologies run

Homologene

FAMILY

CATEGORY signaling growth factor , receptor membrane

basic FUNCTION

- receptor tyrosine kinase class IV, negative regulator of bone growth, playing an important role in the control of chondrocyte proliferation and differentiation, a process critical for normal development of the skeleton
- promotion and inhibition of chondrocyte proliferation and differentiation depending on the time during development (mouse)
- negative regulation of endochondral ossification
- involved in lysosomal degradation through c-Cbl mediated ubiquination (defective in achondroplasia)
- potential molecular targets with its ligand FGF18, for intervention in tissue engineering aimed at cartilage repair and regeneration of damaged cartilage

implicated in a process

cellular process

physiological development

pathway

metabolism

signaling

a component

structural

INTERACTION

DNA

RNA

small molecule

protein
- IHH (negative regulator of IHH)
- STAT protein, PTHLH

cell & other

REGULATION

ASSOCIATED DISORDERS

corresponding disease (s): ACH , CRS10 , CRS5B , CRSCNS , CRS8 , SADDAN , TNTP1 , TNTP2 , HCH , BSCGS2 , LADD2 , CATSHL

Other morbid association(s)

Type	Gene Modification	Chromosome rearrangement	Protein expression	Protein Function
tumoral		LOH		
in transitional cell carcinomas				
tumoral	somatic mutation			
in superficial urothelial cell carcinoma (UCC), in bladder carcinomas (superficial or low-grade)				
constitutional	somatic mutation			gain of function
somatic activating mutations in acanthosis nigricans and seborrheic keratosis				
tumoral			other	
dysregulated in multiple myeloma with t(4;14)(p16.3;q32)				

Susceptibility

Variant & Polymorphism

Candidate gene

Therapy target: therapeutic target of the small molecule inhibitor PKC412 in hematopoietic malignancies (for multiple myeloma associated with overexpression of FGFR3, and perhaps other diseases associated with dysregulation of FGFR3 or related mutants)

animal or cellular model